AMENDMENTS TO THE CLAIMS

The following is a complete listing of the claims indicating the current status of each claim and including amendments currently entered as highlighted.

1-26. (canceled)

27. (previously presented)A method for achieving optical amplification of an optical signal passing through an indirect-gap semiconductor, the method comprising the steps of:

(a) providing a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a given wavelength, wherein said indirect-gap semiconductor is silicon, and wherein said at least one element is chosen from the group comprising: Gold, Silver, Platinum, Iron, Copper, Zinc, Cobalt, Tellurium, Mercury, Nickel, Sulfur and Manganese; and

(b) irradiating a target region of said body of semiconductor with optical illumination of a wavelength shorter than said given wavelength in such a manner as to cause population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.

28. (original) The method of claim 27, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.

29. (canceled)

30. (original) The method of claim 27, wherein said at least one element is chosen from the group comprising: Gold, Silver and Platinum.

31. (original) The method of claim 27, wherein said at least one element includes Gold.

32. (original) The method of claim 31, wherein said given wavelength is in the range of 1.2-2.2 micrometers.

33. (withdrawn) The method of claim 27, wherein said irradiating is performed using a pulsed laser source.

34. (original) The method of claim 27, wherein said irradiating is performed using a substantially continuously irradiating laser source.

35. (original) The method of claim 27, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.

36-41. (canceled)

42. (previously presented)An apparatus for achieving optical amplification of an optical signal of a given wavelength within a target region of an indirect-gap semiconductor, the apparatus comprising:

(a) a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of the given wavelength, wherein said indirect-gap semiconductor is silicon, and wherein said at least one element is chosen from the group comprising: Gold, Silver, Platinum, Iron, Copper, Zinc, Cobalt, Tellurium, Mercury, Nickel, Sulfur and Manganese;

(b) an irradiating arrangement configured to generate optical illumination of a wavelength shorter than said given wavelength and deployed for irradiating a target region of said body of semiconductor with said optical illumination in such a manner as to generate population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.

43. (previously presented)The apparatus of claim 42, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.

44. (canceled)

45. (previously presented)The apparatus of claim 42, wherein said at least one element is chosen from the group comprising: Gold, Silver and Platinum.

46. (previously presented)The apparatus of claim 42, wherein said at least one element includes Gold.

47. (previously presented)The apparatus of claim 46, wherein said given wavelength is in the range of 1.2-2.2 micrometers.

48. (withdrawn) The apparatus of claim 42, wherein said irradiating is performed using a pulsed laser source.

49. (previously presented)The apparatus of claim 42, wherein said irradiating is performed using a substantially continuously irradiating laser source.

50. (previously presented)The apparatus of claim 42, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.

51. (canceled)

52. (new) A method for achieving optical amplification of an optical signal passing through an indirect-gap semiconductor, the method comprising the steps of:

(a) providing a body of the indirect-gap semiconductor doped with at least one element so as to generate at least one added energy level at a known energy lying within the energy band-gap of the semiconductor, said added energy level enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a given wavelength, wherein said at least one element is non-isoelectronic with atoms of said indirect-gap semiconductor; and

(b) irradiating a target region of said body of semiconductor with optical illumination of a wavelength shorter than said given wavelength in such a manner as to cause population inversion of charge carriers within the target region, thereby causing amplification of an optical signal of said given wavelength within said target region.

53. (new) The method of claim 52, wherein said illumination has a wavelength no greater than a wavelength of a photon corresponding to the transition between the conduction gap and the valence band in said semiconductor.

54. (new) The method of claim 52, wherein said given wavelength is in the range of 1.2-2.2 micrometers.

55. (new) The method of claim 52, wherein said target region lies at least partially in an optical waveguide formed in said body of semiconductor.